UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
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Ref: 8EPR-EP

Art Compton, Division Administrator
Planning, Prevention & Assistance Division
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Re: TMDL Approvals
Careless Creek (sediment)
Lone Tree Creek (nitrogen)

Dear Mr. Compton:

We have completed our review of the total maximum daily loads (TMDLs) as submitted by your office for the waterbodies listed in the enclosure to this letter. In accordance with the Clean Water Act (33 U.S.C. 1251 *et. seq*.), we approve all aspects of the TMDLs as developed for the water quality limited waterbodies as described in Section 303(d)(1).

Based on our review, we feel the separate TMDL elements listed in the enclosed review table adequately address the pollutants of concern, taking into consideration seasonal variation and a margin of safety. In approving these TMDLs, EPA affirms that the TMDL has been established at a level necessary to attain and maintain the applicable water quality standards and has the necessary components of an approvable TMDL. Please find enclosed a detailed review of these TMDLs.

We also wish to inform you that our office has received concurrence from the U.S. Fish and Wildlife Service regarding our biological evaluations of the approval of the Careless Creek and Lone Tree Creek TMDLs. Our biological evaluations assessed the effects of our approval on the threatened, endangered, proposed, and candidate species in the area of the TMDLs. Our conclusion was that the TMDL approvals would either have no effect or would not likely have an adverse effect on the species of concern. Any effect of the TMDL approvals was seen as either insignificant or beneficial to the species.

Thank you for your submittal. If you have any questions concerning this approval, feel free to contact Bruce Zander of my staff at 303/312-6846.

Sincerely,

Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection and
Remediation

Enclosure

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Enclosure

APPROVED TMDLS

Waterbody Name*	TMDL Parameter/ Pollutant	Water Quality Goa Endpoint	TMDL	Section 303(d)(1) or 303(d)(3) TMDL	Supporting Docum ıtation *(a partial list of supportir documents)*
Careless Creek* MT40A002_050 (Upper Musselshell River watershed HUC 10040201)	sediment	Narrative Standard: *"No increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife" (ARM 17.30.629(f))* Beneficial Use Standard: *"...suitable for bathing, swimming and recreation, growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers." (ARM17.30.6529(l))* [The success of meeting these standards will be gauged by monitoring physical and biological parameters such as: flow, total suspended solids, temperature, conductivity, pH, amount of bank erosion, stream cross sections, pebble counts, photoplots, macroinvertebrates, and fish. A goal of approximately 155 mg/l sediment concentration (suspended and bedload combined) during a stable flow of 150 cfs has been suggested as a reasonable target for ambient sediment levels.]	25% reduction in long term sediment yield TMDL partially implemented by: restoration of 54% of eroding banks increase in stream length by 4 percent (i.e., increase in channel sinuosity) maximum flow target of 100 cfs at Careless Canal diversion and 80 cfs at mouth of Careless Creek	Section 303(d)(1)	Careless Creek Water Quality Restoration Plan (MT DEQ; February 22, 2001) Protocol for Developing Sediment TMDLs (First Edition); EPA 841-B-99-004; October 1999. Musselshell River Basin and Careless Creek Watershed Coordinated Watershed Plan; May 1998) Study of the Deadman's Bsin Reservoir Careless Creek Release System (Aquoneering; February 1991) Musselshell River Basin Water Management Study (U.S. Bureau of Reclamation, *et al.*; October 1997) Developments on Careless Creek to Reduce NonPoint Source Sediment (V. Sellers; 1999) Development of TMDL to Reduce NonPoint Source Sediment (V. Sellers, 1999) Technical Report: The Careless Creek Inventory; Use of the Global Positioning System (BPS) as a Tool to Inventory Streambank Condition (USDA/NRCS; 1995)
Lone Tree Creek* MT40O002_050 Lower Milk River Basin (HUC 10050012)	nitrogen	1 mg/l total Kjeldahl nitrogen periphyton pollution index of 2.00 or greater	80 percent reduction in long term nitrogen load TMDL partially implemented by: restoration of riparian areas along 37% of the stream miles to a proper function condition (PFC) re-activation of 0.25 mile of abandoned channel	§303(d)(1)	Lone Tree Creek TMDL Addressing Riparian Habitat Degradation, Flow Alteration, and Nutrient Enrichment (MT DEQ; February 16, 2001) Protocol for Developing Sediment TMDLs (First Edition); EPA 841-B-99-004; October 1999. Protocol for Developing Nutrient TMDLs (First Edition); EPA 841-B-99-007; November 1999. Missouri-Lone Tree Watershed Plan (USDI/BLM; Jly 1997) Grazing Best Managment Practices (USDA/NRCS; 1996)

* An asterisk indicates the waterbody has been included on the State's Section 303(d) list of waterbodies in need of TMDLs.

TMDL Review Table

The following table provides a summary of EPA's review of TMDLs submitted to it from Montana Department of Environmental Quality in correspondence dated March 8 , 2001 (Careless Creek TMDL) and February 16, 2001 (Lone Tree Creek TMDL). Each TMDL is reviewed according the EPA Region VIII's criteria which include:

A. Water Quality Standards TMDLs result in maintaining and attaining water quality standards *(including the numeric, narrative, use classification, and antidegradation components of the standards; the "phased" TMDL can be used where there is a level of uncertainty; in addition, TMDLs can rely on either regulatory or voluntary approaches to attain standards);*

B. Water Quality Targets TMDLs have a quantified target or endpoint *(a numeric water quality standard often serves as the target, but any indicator or set of indicators which represent the desired condition would suffice);*

C. Significant Sources TMDLs must consider all significant sources of the stressor of concern *(all sources or causes of the stressor must be identified or accounted for in some manner; this accounting can lump several sources of unknown origin together; the TMDL need only address the control of a subset of these sources as long as the water quality standards are expected to be met);*

D. Technical Analysis TMDLs are supported by an appropriate level of technical analysis *(allocations for nonpoint sources are often best professional estimates whereas waste load allocations for point sources are often based on a more detailed analysis);*

E. Margin of Safety/Seasonality TMDLs must contain a margin of safety and consider seasonality *(a margin of safety can be either explicit or implicit in the analysis or assessment);*

F. TMDL TMDLs include a quantified pollutant reduction target, but this target can be expressed in any appropriate manner *(According to EPA reg (see 40 C.F.R. 130.2(i)) TMDLs need not be expressed in pounds per day or concentration when alternative means of expression are better suited to the waterbody problem; TMDLs can be expressed as mass per unit of time, toxicity, % reduction in sediment or nutrients, or other measure);*

G. Allocation TMDLs apportion responsibility for taking actions *(allocations may be expressed in a variety of ways such as by individual discharger, by tributary watershed, by source or land use category, by land parcel, or other appropriate scale or dividing responsibility);*

H. Public Participation TMDLs involve some level of public involvement or review *(public participation should fit the needs of the particular TMDL).*

Careless Creek Sediment TMDL Review (see Careless Creek Water Quality Restoration Plan ; MT DEQ, February 22, 2001)	
A. Water Quality Standards	The State's submittal provides a good description of the geographic scope of the TMDL as well as information on the watershed and land use characteristics of Careless Creek.. Careless Creek is classified by the State as a C-3 waterbody which means it is "suitable for bathing, swimming and recreation, growth and propagation of nonsalmonid fishes and associated aquatic life, waterfowl and furbearers." (See ARM 17.30.629(l)) It was found that Careless Creek was partially supporting its fishery and other aquatic life uses.
B. Water Quality Standards Targets	Water quality targets for this TMDL are based on narrative provisions within the State standards including: Narrative Standard: *"No increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife" (ARM 17.30.629(f))* Beneficial Use Standard: *"...suitable for bathing, swimming and recreation, growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers." (ARM17.30.6529(l))* [The success of meeting these standards will be gauged by monitoring physical and biological parameters such as: flow, total suspended solids, temperature, conductivity, pH, amount of bank erosion, stream cross sections, pebble counts, photoplots, macroinvertebrates, and fish. A goal of approximately 155 mg/l sediment concentration (suspended and bedload combined) during a stable flow of 150 cfs has been suggested as a reasonable target for ambient sediment levels.]
C. Significant Sources	The primary sources/causes of sediment include erosion of soils in pastures, degraded riparian habitat, erosive stream banks, a excessive flows. A very detailed inventory of these various sources was undertaken over a period of years. The mainstem of Careless Creek was broken into 12 individual segments, with sources/causes of sediment identified in each of the segments.
D. Technical Analysis	This TMDL addresses sediment yield associated with nonpoint sources. The technical strength of this TMDL is in the identification of significant sediment sources and the establishment of appropriate water quality goals by which success is measured. Best professional judgement was used as well as reference reach methods were identify causes of the excessive sediment, to identify sediment reduction levels to restore the aquatic life uses, and to identify what management practices need to be applied within the watershed to achieve water quality goals. Analysis of sediment fate and transport was done at different flow levels to determine what constituted a "stable" flow which minimized sediment uptake through bank erosion. The method used by the State is reasonable to identify pollutant sources/causes within the watershed, to develop an acceptable TMDL as well as an implementation plan for that TMDL. It is also reasonable to expect a significant decrease in sediment load in Careless Creek associated with the application of the recommended controls in this TMDL.
E. Margin of Safety & Seasonality	To address uncertainty related to the effectiveness of this TMDL, the margin of safety was incorporated in this TMDL by using an implicit conservative approach to implementing the provisions of the TMDL to address uncertainty. First, there will be post-implementation monitoring of stream health to determine the effectiveness of the TMDL and lead to further restoration work, if needed. Second, there will be reliance on both a physical as well as a biological water quality endpoint to gauge success (rather than gauging success on just one metric). Third, the TMDL control actions call for additional BMPs to be applied in the event the water quality goals are not realized. Seasonality was considered in this TMDL by addressing the wide range of sediment discharged into the creek during the various seasons of the year. In particular, inventories and evaluations were made on sediment yield and channel stability in irrigated and non-irrigated season. Implementation of the TMDL will result in controlling sediment yield during all seasons of the year and will address sediment controls on an average annual basis rather than on a season-by-season basis.

F. TMDL	The acceptable daily or annual load of sediment in terms of mass per time is difficult to determine in many watersheds such as the Careless Creek watershed. First, the acceptable load of sediment varies from year to year. What may be an acceptable sediment load in one year may not be an acceptable load in yet another year because of varying conditions. Second, the acceptable load is a function of various factors such as hydrology, source type, relative location of the source within the watershed, and time of year. All these factors make the acceptable load a complex function that is highly variable and not easily expressed in terms of a mass per time number. In its regulations at 40 C.F.R. 130.2(i), EPA allows TMDLs to be expressed in measures other than mass per time, including "...other appropriate measures." In EPA's Protocol for Developing Sediment TMDLs (US EPA; October 1999, EPA 841-B-99-004), the Agency concludes that alternative approaches to sediment TMDLs that are not expressed in terms of maximum allowable mass load per unit of time are appropriate. The protocol states in page 2-4 that "(T)he alternative measures for sediment TMDLs can take several forms..." including expressions of numeric biological targets and substrate targets. Further, the protocol states on page 7-4 that TMDLs can be expressed in terms of percentage reduction targets. The Careless Creek TMDL followed this approach by expressing the TMDL as a 25% reduction in long term sediment yield. The Careless Creek TMDL falls within EPA guidelines when it expresses the TMDL in terms of percentage reduction backed up by other surrogate measures of channel stability and maximum flow. These measures are effective surrogates to the reduction of significant sources of sediment. In particular, the TMDL is largely expressed in terms of reducing the sediment load from erosive banks, the most significant source of sediment in the watershed. Flow control along with grazing management practices and restoration of the stream channel physical habitat are all part of the overall plan to restore the watershed and address the significant sediment sources. The success of the TMDL will be gauged by monitoring a number of physical and biological measures in Careless Creek as well as documenting the success of BMPs through photoplots. The TMDL for Careless Creek as expressed in terms of a percent reduction in sediment yield is considered to be a multi-year average. Again, the acceptable load (or load reduction) associated with sediment yield from a watershed varies from year-to-year. Such variability is addressed in the Careless Creek TMDL by defining the TMDL as an average over the long term. EPA's protocol also states that alternative forms of TMDLs can be expressed in terms of specific actions shown to be adequate to result in attainment of numeric targets. For Careless Creek, the needed sediment reduction of 25% will be achieved primarily through stabilization of eroding banks, restoration of channel characteristics (i.e, sinuosity and slope), and controlling the amount of flow in the Creek. This method of expressing the TMDL provides a clear path to the measures needed to restoration of the watershed. In addition, this TMDL has a reasonable likelihood of achieving the aquatic life and fishery use for which Careless Creek is classified. The provisions of the TMDL will be implemented through a series of various means, including funding from Montana Department of Fish, Wildlife, and Parks, EPA, the Grazing Land Conservation Initiative, and USDA's Environmental Quality Incentive Program (EQIP).
G. Allocation	There are no point sources within this watershed that contribute to the sediment load. Therefore, the wasteload allocation (WLA) component for the TMDL is zero and all the acceptable sediment load can be allocated to the load allocation (LA) of the TMDL. All significant sources have been considered in this TMDL. EPA regulations at 40 C.F.R. 130. 2(g) state that load allocations (i.e., that portion of a receiving water's loading capacity that is attributed either to nonpoint sources such as sediment sources in Careless Creek) may be expressed in a range of ways from reasonable accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. The 25% reduction attributed to control on nonpoint sources and flows is considered a gross allotment/load allocation. EPA's protocol for sediment TMDLs states on page 7-4 that allocations can be expressed in terms of maximum allowable loads, percentage reduction targets, or performance-based actions or practices. The Careless Creek TMDL uses a combination of both percentage reduction targets and performance-based actions. The protocol on page 7-5 further describes the performance-based method as a way of describing detailed sediment control practices to be implemented to address specific sources of concern. The Careless Creek TMDL accomplishes this by providing a segment-by-segment allocation of management practices to address sediment. (Careless Creek was divided into 12

	segments, each with its own inventory, assessment, and prescription of management practices. This manner of allocation is consistent with EPA's guidance.
H. Public Participation	The State's submittal includes a good summary of the public participation process that has occurred which describes the ways the public has been given an opportunity to be involved in the TMDL development process. In particular, the State has encourage participation through public meetings in the watershed, education brochures, and widespread solicitation of comments on the draft TMDL. The State also employed the Internet to post the draft TMDL and to solicit comments. The level of public participation is found to be adequate.

Lone Tree Creek Nutrient TMDL Review (see Lone Tree Creek TMDL Addressing Riparian Habitat Degradation, Flow Alteration, and Nutrient Enrichment; MT DEQ; February 16, 2001)	
A. Water Quality Standards	Lone Tree Creek is an intermittent stream classified by the State as a B-3 warm water fishery. (See ARM 17.30.610(8)) It was found that Lone Tree Creek was partially supporting its fishery and other aquatic life uses. In particular, this TMDL will address the State's narrative standard regarding undesirable aquatic life as stated: "*State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that create conditions which produce undesirable aquatic life*". (See ARM 17.30.637(1)(e))
B. Water Quality Standards Targets	The Lone Tree Creek TMDL addresses the narrative standards established by the State of Montana for the controls of undesirable aquatic life, including excessive algal growth. In interpreting this narrative standard for purposes of this TMDL, the State has established an ambient goal of 1 mg/l-N total Kjeldahl nitrogen ("TKN") for Lone Tree Creek to limit algal growth to acceptable levels. The State has also established a goal of 2.00 or greater for the in-stream periphyton pollution index[1] as an additional indicator of acceptable limitations on algal growth.
C. Significant Sources	The primary sources/causes of nutrients in the Lone Tree Creek watershed are primarily in-channel erosion and erosion from degraded riparian areas along the creek.
D. Technical Analysis	This TMDL addresses sediment yield associated with nonpoint sources. The technical strength of this TMDL is in the identification of significant nutrient sources and the establishment of appropriate water quality goals by which success is measured. Best professional judgement was used as well as reference reach methods to identify causes of the excessive sediment, to identify sediment reduction levels to restore the aquatic life uses, and to identify what management practices need to be applied within the watershed to achieve water quality goals. Reference to historical patterns of land use through time via aerial photographs was a valuable tool to identify the relationship between the condition of upland, riparian, and channel with the health of the creek. Further, established methods were used to assess the condition of the uplands and riparian condition. Both the uplands and riparian condition affect the condition of the creek. Finally, a reference reach approach was used to establish reasonable TKN and periphyton pollution index values as endpoint for this TMDL. The methods used by the State is reasonable to identify pollutant sources/causes within the watershed, to develop an acceptable TMDL as well as an implementation plan for that TMDL. It is also reasonable to expect a significant decrease in nutrient load in Lone Tree Creek associated with the application of the recommended controls in this TMDL.
E. Margin of Safety & Seasonality	To address uncertainty related to the effectiveness of this TMDL, the margin of safety was incorporated in this TMDL by first establishing a water quality goal more restrictive than needed. In particular, reference streams that have acceptable levels of algae elsewhere in the basin have an average of 2 mg/l TKN. The target for Lone Tree Creek was set at a more conservative value of 1 mg/l. Further, post implementation monitoring will be employed to judge success of the TMDL, allowing for an adaptive management approach to assure success of the TMDL. Finally, there will be reliance on both a chemical, physical, as

[1] The periphyton pollution index is a composite numeric expression of the pollution tolerances of common diatom species. A value of 1.5 or less is indicative of severe pollution, values between 1.5 and 2.0 indicate moderate pollution, and values between 2.0 and 2.5 indicate minor pollution, and values above 2.5 indicate no pollution. (see Bahls, L.R. and R. Bukantis and S. Tralles. 1992. Benchmark Biological of Montana Reference Streams. Periphyton bioassessment methods for Montana streams. Water Quality Bureau, Montana Department of Health and Environmental Sciences. Helena, Montana.)

	well as biological endpoint to gauge success of this TMDL (rather than gauging success on just one metric). Seasonality was considered in this TMDL by looking at the seasonal variations in hydrology. In particular, nitrogen is mobilized primarily during spring runoff due to snowmelt and during periods of rain storms. The TMDL and corresponding controls take into account this seasonal phenomenon.
F. TMDL	The acceptable daily or annual load of sediment in terms of mass per time is difficult to determine in many watersheds such as the Lone Tree Creek watershed. First, the acceptable load of nitrogen varies from year to year. What may be an acceptable nutrient load in one year may not be an acceptable load in yet another year because of varying conditions. Second, the acceptable load is a function of various factors such as hydrology, source type, relative location of the source within the watershed, and time of year. All these factors make the acceptable load a complex function that is highly variable and not easily expressed in terms of a mass per time number. In its regulations at 40 C.F.R. 130.2(i), EPA allows TMDLs to be expressed in measures other than mass per time, including "...other appropriate measures." In EPA's Protocol for Developing Sediment TMDLs (US EPA; October 1999, EPA 841-B-99-004), the Agency concludes that alternative approaches to TMDLs that are not expressed in terms of maximum allowable mass load per unit of time are appropriate. The protocol states in page 2-4 that "(T)he alternative measures for sediment TMDLs can take several forms..." including expressions of numeric biological targets and substrate targets. Further, the protocol states on page 7-4 that TMDLs can be expressed in terms of percentage reduction targets. The Lone Tree Creek TMDL followed this approach by expressing TMDL as an 80 percentage reduction target of TKN. The Lone Tree Creek TMDL falls within EPA guidelines when it expresses the TMDL in terms of percentage reduction backed up by other surrogate measures associated with riparian health. In particular, the TMDL is largely expressed in terms of reducing the nitrogen load from erosive banks and riparian areas, the most significant source of nonpoint source nitrogen in the watershed. The success of the TMDL will be gauged by monitoring a number of physical, chemical, and biological measures in Lone Tree Creek as well as documenting the success of BMPs through photoplots.
G. Allocation	There are no point sources within this watershed that contribute to the nitrogen load. Therefore, the wasteload allocation (WLA) component for the TMDL is zero and all the acceptable nitrogen load can be allocated to the load allocation (LA) of the TMDL. All significant sources have been considered in this TMDL. EPA regulations at 40 C.F.R. 130. 2(g) state that load allocations (i.e., that portion of a receiving water's loading capacity that is attributed either to nonpoint sources such as nitrogen sources in Lone Tree Creek) may be expressed in a range of ways from reasonable accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. The 80% reduction attributed to nonpoint source controls and stream restoration is considered a gross allotment/load allocation. EPA's protocol for sediment TMDLs states on page 7-4 that allocations can be expressed in terms of maximum allowable loads, percentage reduction targets, or performance-based actions or practices. The Lone Tree Creek TMDL uses a combination of both percentage reduction targets and performance-based actions. The protocol on page 7-5 further describes the performance-based method as a way of describing detailed sediment control practices to be implemented to address specific sources of concern. The Lone Tree Creek allocates performance-based actions on an allotment basis and a subwatershed basis. This manner of allocation is consistent with EPA's guidance.
H. Public Participation	The State's submittal includes a good summary of the public participation process that has occurred which describes the ways the public has been given an opportunity to be involved in the TMDL development process. In particular, the State has encourage participation through public meetings in the watershed,

	education brochures, and widespread solicitation of comments on the draft TMDL. The State also employed the Internet to post the draft TMDL and to solicit comments. The level of public participation is found to be adequate.